

## Section 20

# FORESTRY, FISHERIES, AND MINING

This section presents data on forests and forest reserves, commercial fishing and fish populations, and mining and mineral products.

Important sources of data on these subjects are *the United States Census of Mineral Industries* and *Mineral Industry Surveys*, and reports and records of the Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources and Division of Forestry and Wildlife. *Historical Statistics of Hawaii*, Section 14, summarizes the data for earlier periods. Comparable national statistics are reported in the *Statistical Abstract of the United States: 1997*, Sections 24 and 25.

**Table 20.01-- FOREST AND NATURAL AREA ACREAGE, BY ISLANDS:  
JUNE 30, 1996 AND JUNE 30, 1997**

Island	Conservation district forest land		Planted forest		Natural areas 3/	
	Forest reserve land 1/	Private forest land 2/	Planted in preceding 3 years	Total standing	Number of areas	Acres
1996 State total	643,134	328,742	108	46,191	19	109,164
Hawaii	438,416	106,745	13	17,138	8	82,535
Maui	73,227	53,180	15	11,892	4	17,123
Kahoolawe	-	-	-	-	-	-
Lanai	-	6,150	-	512	-	-
Molokai	16,030	-	10	3,238	2	2,950
Oahu	32,462	88,817	63	7,162	3	1,770
Kauai	82,999	73,850	7	6,249	2	4,786
Niihau	-	-	-	-	-	-
1997 State total	643,134	328,742	108	46,191	19	109,164
Hawaii	438,416	106,745	13	17,138	8	82,535
Maui	73,227	53,180	15	11,892	4	17,123
Kahoolawe	-	-	-	-	-	-
Lanai	-	6,150	-	512	-	-
Molokai	16,030	-	10	3,238	2	2,950
Oahu	32,462	88,817	63	7,162	3	1,770
Kauai	82,999	73,850	7	6,249	2	4,786
Niihau	-	-	-	-	-	-

1/ State-owned and privately owned-lands under surrender agreement in forest reserve system.

2/ Private forest land within conservation district. The majority of these lands were previously in the forest reserve system.

3/ Includes Waimanu Research Reserve (3,600 acres) and Alakai Wilderness Preserve (9,939 acres).

Source: Hawaii State Department of Land and Natural Resources, Division of Forestry and Wildlife, records.

**Table 20.02-- WOODLAND ON FARMS, 1982 TO 1992, AND BY COUNTIES, 1992**

[Acres]

Use	1982	1987	1992				
			State total	Hawaii	Maui	Honolulu	Kauai
Total	117,270	99,135	109,391	79,319	(D)	1,094	(D)
Pastured	36,550	27,517	40,909	22,606	(D)	474	(D)
Not pastured	80,720	71,618	68,482	56,713	10,047	620	1,102

D Withheld to avoid disclosing data for individual farms.

Source: U.S. Bureau of the Census, *1992 Census of Agriculture, Hawaii*, AC92-A-11 (October 1994), pp. 17 and 156.

**Table 20.03-- FOREST AND BRUSSLAND FIRES, BY COUNTIES:  
1995 TO 1997**

[Years ended June 30]

County	Number of fires			Acres burned		
	1995	1996	1997	1995	1996	1997
State total	198	131	69	23,946	477	378
Hawaii	86	78	30	21,635	232	40
Maui	44	42	24	2,019	67	40
Honolulu	67	10	11	292	175	297
Kauai	1	1	4	-	3	1

Source: Hawaii State Department of Land and Natural Resources, Division of Forestry and Wildlife, records.

**Table 20.04-- COMMERCIAL FISHING: 1989 TO 1997**

[Years ended June 30]

Year	Number of commercial fishermen	Commercial fish catch 1/		
		Pounds landed	Pounds sold	Value to primary producers (dollars)
1989	3,491	14,008,279	13,524,731	29,815,290
1990	3,551	16,663,945	16,090,478	39,902,182
1991	4,043	22,218,099	21,331,184	53,769,946
1992	3,800	23,578,601	22,761,039	55,381,574
1993	3,836	25,209,513	24,562,796	61,059,027
1994	4,060	24,028,693	23,310,535	57,999,092
1995	3,827	23,970,722	22,945,408	55,283,593
1996	3,672	23,968,916	23,018,189	52,443,466
1997	3,632	25,319,795	24,589,553	53,343,330

1/ Represents the total catches of all licensed commercial fishers. Includes both sea and pond catches. Data for 1989-1993 revised from *Data Book 1993-94*, table 20.5.

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, *Commercial Fish Landings for Fiscal Year* (annual), as revised, and records.

**Table 20.05-- COMMERCIAL FISH CATCH, BY SPECIES: 1995**

[Year ended June 30, 1995]

Species	Pounds caught	Pounds sold	Value (dollars)
Total catch	23,970,722	22,945,408	55,283,593
Sea catch, all species	23,936,995	22,912,940	55,206,105
Tunas	12,598,580	12,136,145	29,610,759
Aku (Skipjack)	1,573,062	1,474,246	1,959,166
Ahipalaha	2,234,027	2,126,552	2,227,790
Bigeye (ahi)	4,246,415	4,188,099	14,687,403
Yellowfin (ahi)	4,488,988	4,298,525	10,449,732
Billfishes	6,309,705	6,135,337	15,350,443
Blue marlin	1,172,025	1,093,365	1,103,813
Striped marlin	865,148	829,373	1,128,852
Swordfish	3,919,546	3,882,041	12,820,371
Miscellaneous pelagic species	2,358,559	2,217,654	3,781,909
Mahimahi	1,230,817	1,139,185	1,998,849
Ono	516,554	476,298	1,087,256
Opah	484,499	478,674	528,818
Deep bottom fishes	868,556	818,980	2,870,304
Opakapaka	330,419	319,549	1,259,354
Uku	165,782	162,965	430,097
Ulaula	119,773	115,138	612,230
Akule/opelu	1,036,137	965,713	1,646,566
Akule	738,166	685,067	1,104,967
Opelu	281,672	264,684	507,591
Jacks	135,881	125,918	218,022
Inshore fishes	287,214	266,426	585,536
Sharks	136,310	77,471	79,183
Lobsters	24,510	22,808	313,186
Crabs	38,870	33,615	139,663
Shrimps	85,149	67,184	350,719
Seaweeds	7,231	5,988	33,243
Miscellaneous	50,293	39,701	226,572
Pond landings, all species	33,727	32,468	77,488

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, *Commercial Fish Landings, State of Hawaii--Fiscal Years 1994-1995* and records.

**Table 20.06-- COMMERCIAL FISH CATCH, BY SPECIES: 1996**

[Year ended June 30, 1996]

Species	Pounds caught	Pounds sold	Value (dollars)
Total catch	23,968,916	23,018,189	52,443,466
Sea catch, all species	23,944,770	22,994,532	52,388,694
Tunas	12,688,842	12,379,886	28,539,177
Aku (Skipjack)	1,879,314	1,796,765	2,433,665
Ahipalaha	2,858,023	2,785,630	3,072,999
Bigeye (ahi)	3,614,525	3,592,181	12,737,030
Yellowfin (ahi)	4,295,377	4,167,558	9,870,500
Billfishes	6,765,706	6,457,378	14,215,199
Blue marlin	1,695,900	1,518,237	1,277,333
Striped marlin	1,466,223	1,414,755	1,279,592
Swordfish	3,339,197	3,275,005	11,369,732
Miscellaneous pelagic species	2,035,262	1,923,176	3,666,879
Mahimahi	746,082	694,153	1,705,855
Ono	569,381	512,382	1,208,511
Opah	604,244	603,358	569,692
Deep bottom fishes	657,162	614,185	2,351,836
Opakapaka	216,989	204,286	875,964
Uku	102,837	99,676	300,348
Ulaula	115,219	112,080	621,445
Akule/opelu	1,009,234	949,058	1,634,433
Akule	529,224	505,097	901,495
Opelu	428,106	393,858	627,232
Jacks	126,022	110,291	199,415
Inshore fishes	339,665	311,399	632,406
Sharks	119,805	64,818	56,602
Lobsters	28,197	26,183	355,087
Crabs	41,519	36,614	157,047
Shrimps	70,386	70,227	343,547
Seaweeds	7,466	6,914	35,492
Miscellaneous	55,504	44,403	201,574
Pond landings, all species	24,146	23,657	54,772

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, *Commercial Fish Landings, State of Hawaii--Fiscal Years 1995-1996* and records.

**Table 20.07-- COMMERCIAL FISH CATCH, BY SPECIES: 1997**

[Year ended June 30, 1997]

Species	Pounds caught	Pounds sold	Value (dollars)
Total catch	25,319,795	24,589,553	53,343,330
Sea catch, all species	25,272,402	24,542,232	53,231,458
Tunas	13,669,343	13,437,806	27,976,535
Aku (Skipjack)	2,150,401	2,062,538	2,668,892
Ahipalaha	3,420,977	3,412,462	3,900,844
Bigeye (ahi)	3,820,918	3,809,506	11,520,331
Yellowfin (ahi)	4,235,749	4,115,227	9,641,885
Billfishes	6,914,329	6,744,237	15,685,901
Blue marlin	1,238,001	1,135,578	1,086,127
Striped marlin	952,989	927,843	1,197,496
Swordfish	4,450,153	4,420,887	13,157,405
Miscellaneous pelagic species	2,454,470	2,315,765	3,830,050
Mahimahi	1,067,892	995,502	1,746,361
Ono	650,121	586,778	1,195,280
Opah	585,756	585,516	664,856
Deep bottom fishes	714,366	671,367	2,530,253
Opakapaka	265,551	254,318	1,110,555
Uku	120,765	115,863	310,704
Ulaula	101,779	96,846	551,153
Akule/opelu	868,431	793,495	1,344,446
Akule	512,709	459,473	821,042
Opelu	335,040	314,206	482,205
Jacks	129,332	115,757	201,420
Inshore fishes	288,434	265,863	590,671
Sharks	67,759	52,163	52,282
Lobsters	37,342	35,398	529,039
Crabs	35,634	29,944	136,513
Shrimps	34,082	33,397	172,397
Seaweeds	8,378	7,646	38,056
Miscellaneous	50,502	39,394	143,895
Pond landings, all species	47,393	47,321	111,872

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, *Commercial Fish Landings, State of Hawaii--Fiscal Years 1996-1997* and records.

**Table 20.08-- COMMERCIAL SEA LANDINGS, BY ISLANDS: 1995 TO 1997**

[Years ended June 30]

Island	Pounds landed	Pounds sold	Value (dollars)
1995			
State total	23,936,995	22,912,940	55,206,105
Hawaii	3,708,925	3,512,238	6,708,789
Maui	655,357	518,137	1,423,379
Lanai	19,373	15,126	35,419
Molokai	64,877	59,044	150,116
Oahu	18,578,836	18,062,815	45,027,811
Kauai and Niihau	909,627	745,580	1,860,591
1996			
State total	23,944,770	22,994,532	52,388,694
Hawaii	4,047,710	3,818,650	6,517,456
Maui	695,779	542,335	1,364,300
Lanai	13,378	9,287	21,634
Molokai	74,237	68,621	190,740
Oahu	18,243,799	17,830,788	42,507,194
Kauai and Niihau	869,867	724,851	1,787,370
1997			
State total	25,272,402	24,542,232	53,231,458
Hawaii	3,738,518	3,535,195	6,109,155
Maui	565,100	423,805	1,126,929
Lanai	23,213	17,222	42,935
Molokai	53,651	48,410	167,833
Oahu	19,923,146	19,715,430	43,940,066
Kauai and Niihau	968,774	802,170	1,844,540

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, *Commercial Fish Landings, State of Hawaii--Fiscal Years 1995-1997* and records.

**Table 20.09-- COMMERCIAL SEA LANDINGS, BY FISHING METHOD:  
1995 TO 1997**

[Years ended June 30]

<b>Fishing method</b>	<b>Pounds landed</b>	<b>Pounds sold</b>	<b>Value (dollars)</b>
1995			
All methods	23,936,995	22,912,940	55,206,105
Aku pole and line	1,049,924	1,047,924	1,404,367
Longline	14,299,465	14,074,471	37,405,275
Handline	3,679,047	3,545,368	8,308,474
Trolling	3,064,873	2,601,465	5,048,401
Net	936,984	875,209	1,421,861
Trap	142,141	123,192	744,435
Albacore troll	615,871	514,378	410,595
All other methods	148,690	130,933	462,697
1996			
All methods	23,944,770	22,994,532	52,388,694
Aku pole and line	1,434,985	1,434,984	1,820,496
Longline	14,071,115	13,895,031	34,889,154
Handline	3,713,208	3,556,162	7,819,282
Trolling	3,332,501	2,822,572	5,140,175
Net	845,841	803,615	1,354,076
Trap	139,613	138,212	770,820
Albacore troll	279,086	233,012	193,899
All other methods	128,421	110,944	400,792
1997			
All methods	25,272,402	24,542,232	53,231,458
Aku pole and line	1,623,910	1,616,589	2,102,305
Longline	16,047,720	15,992,066	36,710,270
Handline	3,741,917	3,603,710	7,950,473
Trolling	2,921,901	2,469,756	4,364,854
Net	660,400	605,737	1,024,264
Trap	125,286	123,208	777,679
Albacore troll	50,199	50,199	40,000
All other methods	101,069	80,967	261,613

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, *Commercial Fish Landings, State of Hawaii--Fiscal Years 1995-1997* and records.

**Table 20.10-- FISH POPULATIONS AROUND SELECTED SHORELINE  
AREAS: YEAR ENDED JUNE 30, 1995**

Location	Species	Fish per acre	Pounds per acre
Marine Life Conservation Districts:			
Hanauma Bay, Oahu:			
Inshore	54	5,423	5,056
Offshore	79	1,577	243
Pupukea, Oahu	84	1,832	144
Waikiki, Oahu	39	1,586	271
Molokini Shoal, Maui	105	2,683	319
Honolua Bay, Maui	56	1,767	510
Manele-Hulopoe Bays, Lanai	93	4,085	477
Lapakahi, Hawaii	62	935	103
Kealakekua Bay, Hawaii	55	1,518	238
Wailea Bay, Hawaii	62	918	94
Old Kona Airport, Hawaii	44	1,718	404
Artificial reefs:			
Maunaloa Bay, Oahu (tire modules)	48	1,888	394
Waianae, Oahu (tire modules)	(NA)	(NA)	294
Keawakapu, Maui	38	2,890	385
Fisheries Management Areas:			
Waikiki-Diamond Head, Oahu	62	2,353	318
Red Hill, Hawaii	45	3,157	131
Pupawai, Hawaii	55	4,834	343
Other areas:			
Honaunau Bay	47	1,628	154

NA Not available.

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, *Statewide Marine Research and Surveys, Survey of Fish and Habitat, July 1, 1994 to June 30, 1995.*

**Table 20.11-- MOST ABUNDANT AND HEAVIEST FISH SPECIES AT SPECIFIED LOCATIONS: YEAR ENDED JUNE 30, 1995**

[Three leading species at each location, based on both individuals per acre and pounds per acre]

Location and species	Individuals per acre		Pounds per acre	
	Rank	Number	Rank	Number
Hanauma Bay MLCD (inshore):				
Manini ( <i>Acanthurus triostegus</i> )	1	1,149	6	214
Pualu ( <i>Acanthurus xanthopterus</i> )	2	745	1	1,873
Saddle-back wrasse ( <i>Thalassoma duperrey</i> )	3	607	9	87
Awa awa ( <i>Elops hawaiiensis</i> )	(1/)	(NA)	2	1,317
Clown tang	8	211	3	276
Waikiki MLCD:				
Ohua/green wrasse	1	290	(1/)	(NA)
Manini ( <i>Acanthurus triostegus</i> )	2	227	3	18
Saddle-back wrasse ( <i>Thalassoma duperrey</i> )	3	218	4	17
Maiii/lavender tang	4	209	1	65
Kala	(1/)	(NA)	2	65
Kealakekua Bay MLCD:				
Eleele	1	323	1	103
Chocolate dip damsel	2	312	6	9
Kole ( <i>Ctenochaetus strigosus</i> )	3	237	4	17
Red weke	6	47	2	18
Yellow tang ( <i>Zebrasoma flarescens</i> )	4	178	3	17

NA Not available.

MLCD Marine Life Conservation District.

1/ Not in first 10.

Source: Hawaii State Department of Land and Natural Resources, Division of Aquatic Resources, *Statewide Marine Research and Surveys, Survey of Fish and Habitat, July 1, 1994 to June 30, 1995.*

**Table 20.12-- MINERAL INDUSTRIES: 1967 TO 1992**

<b>Subject</b>	<b>1967</b>	<b>1972</b>	<b>1977</b>	<b>1982</b>	<b>1987</b>	<b>1992</b>
Number of establishments	12	15	7	12	9	7
With 20 employees or more	3	5	2	4	4	4
All employees:						
Number (1,000)	.2	.3	.1	.2	.2	.2
Payroll (million dollars)	1.6	2.4	1.9	3.8	7.4	9.4
Production, development, and exploration workers:						
Number (1,000)	.2	.2	.1	.1	.2	.2
Hours (millions)	.4	.4	.2	.2	.4	.4
Wages (million dollars)	1.3	1.8	1.5	2.6	5.7	8.1
Value added by mining (million dollars)	5.0	9.0	8.1	9.7	23.5	27.3
Cost of supplies used, purchased machinery installed, etc. (million dollars)	2.3	4.1	2.9	5.9	10.4	11.3
Value of shipments and receipts (million dollars)	5.5	11.0	9.7	12.8	31.1	33.7
Capital expenditures (million dollars)	1.8	2.0	1.3	2.7	2.8	4.8

Source: U.S. Bureau of the Census, *1987 Census of Mineral Industries, Geographic Area Series, Pacific States*, MIC87-A-9 (October 1990), Hawaii table 1; *1992 Census of Mineral Industries, Geographic Area Series, Pacific States*, MIC92-A-9 (May 1996), Hawaii table 1.

**Table 20.13-- NONFUEL MINERAL PRODUCTION: 1994 TO 1996**

[Estimated production as measured by mine shipments, sales, or marketable production, including consumption by producers]

<b>Minerals</b>	<b>1994</b>	<b>1995 1/</b>	<b>1996 2/</b>
QUANTITY (1,000 METRIC TONS)			
Cement:			
Masonry	6.00	5.00	5.00
Portland	404	357	305
Sand and gravel (construction)	521	405	425
Stone (crushed) 3/	8,170	7,450	7,800
VALUE (\$1,000)			
Total 4/	116,000	114,000	112,000
Cement:			
Masonry	395	501	455
Portland	28,300	35,500	30,300
Sand and gravel (construction)	4,740	4,030	4,340
Stone (crushed) 3/	82,300	73,500	77,200

1/ Revised.

2/ Preliminary.

3/ Excludes certain stones, to avoid disclosing data for individual firms.

4/ Partial total, excludes values that must be concealed to avoid disclosing company proprietary data.

Source: U.S. Geological Survey, Bureau of Mines, "The *Mineral Industry of Hawaii*" from internet address <http://minerals.er.usgs.gov/minerals/pubs/state/hi.html#myb> (1996 PDF).